THE

YOUNG MECHANIC.

VOL. I. APRIL, 1832. No. IV.

OBSERVATIONS ON DRAWING INSTRUMENTS.

[Continued from page 34]

THE DRAWING PEN.

THE drawing pen is an instrument used only for drawing straight or slightly curved lines. They are made in many different forms, but they all consist of two blades of steel fixed to a handle, which being bent, have a tendency to spring open from each other, and to allow the points to be brought very near together. They have a screw or equivalent contrivance passing through both lips by which the points may be closed together to any required degree, as the line is to be drawn stronger or finer. The ink being put into the small opening between the points, about a drop is retained, which flows down as occasion requires. The pen should be fed with ink, by a camel's-hair pencil, which comes to a very fine point so as to pass freely through it. In using the pen, it must be fairly applied to the edge of the ruler, the breadth of the intended line being regulated by a screw, and drawn along it, taking care to hold it so that both points touch the paper at once, or it will not draw an even but a ragged line. It will act best if it is held a little inclined in the direction of its motion; it then leaves fairly upon the paper a breadth of ink equal to the opening between the points.

The points of the pen should be rather round, that they may not penetrate the paper, and that they may move easily over it, which would not be the case if they were too fine; but in thickness they should be quite sharp at the edge—otherwise they will not make a regular and a fine line. A great deal depends on the quality of the paper upon which we are to work. If what is called the cartridge is used, it is best to have the points rather blunt, as they do not wear so fast. The best kind of pens consist of two long blades of steel, held together in the centre by a rivet, upon which they turn, and secured at the top by a brass cap which has a female screw cut in it, to fit on the extremities of both blades, which being laid together have a screw formed on them. The lower parts of the blades have a milled screw for adjusting the distance between

them. When it requires sharpening, the lower screw is taken out, and the brass cap unscrewed. The blades may then be opened like a pair of scissors. The points of all pens should be made of the best hardened and tempered steel, as by constant use they frequently grow blunt at the edges, and must then be repaired by rubbing them upon a hone to sharpen the edges again. In doing this, great care is necessary to make both points correspond in length and breadth, and will require a great deal of practice to enable the student to do this with correctness. The best mode is to wear a groove in the stone by constantly rubbing the pen in the same place. This gives both lips the same breadth and contour, but still they may not be of the same length. To remedy this, pens have been invented, so that both blades, by turning a screw or otherwise, might be accurately adjusted to the same length. The cuts below will serve to illustrate a pen of this description.

Fig. 1

Fig. 2.

Fig. 3.

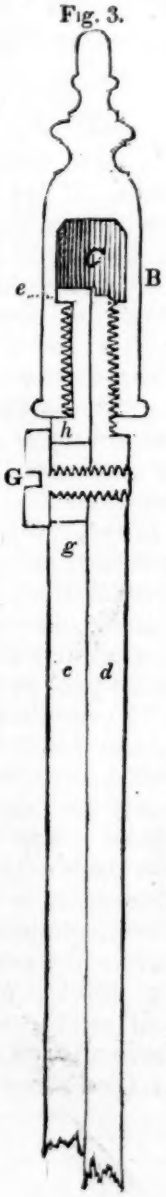


Fig. 4.

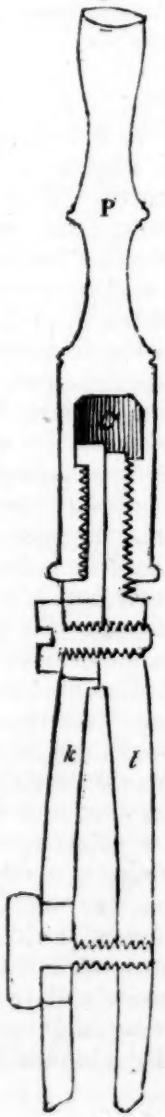


Fig. 1 (with the exception of the dotted screw head *a*) and Fig. 2, represent the two kinds of drawing pens most in use. The improvements which are to be applied to each, are shown in Figs. 3 and 4. As Fig. 1 is *now* constructed, a screw is cut on the end of the lips *c* and *d*, on which is screwed the brass cap B. In Fig. 3 it will be perceived that a chamber C is cut, the radius of which is larger than the interior radius of the screw, by the projection *e* on the lip *c*. The screw on the lip *c* is to be filed off down to its interior radius, and the projection *e* made on the end. The screw is left on the lip *d*. G is a screw for clamping the two lips; and a space *gh* is made in the lip *c*, of sufficient length to allow the 'play' of the screw G, occasioned by the movement of the lip *d*. A similar space should be cut at D, Fig. 1. It will now be evident that when the screw G is loosened, and the brass cap B is turned, the lip *d* will recede or advance, so that we can at any time perfectly adjust the lips *c* and *d* to the same length, and when the screw G is tightened, there can be no possibility of turning the cap B by handling the pen, or by accidentally dropping it, or otherwise. In Fig. 4, *k* and *l* are lips similar to *k* and *l* in Fig. 2. The remaining parts need no description, as they are exactly like Fig. 3.

The same observations in regard to sharpening will apply to pens which are to be inserted in the compass leg, only it must be observed that when an arc of a circle is to be described of more than an inch radius the ink point should be bent in the joint so as to stand perpendicular to the paper; otherwise the line will not be smooth. The common pens are formed with a joint to unite the two blades together, having a small spring between them to force them open, and an adjustiug screw for closing. It is necessary that the blades should be wiped very clean before the pen is put away; otherwise they will rust and spoil. Here let me caution the student against using common ink in his pen. The vinegar it contains acts very powerfully on the points, and is apt to corrode them so much that the pen will soon be rendered unfit for use. The top part of the pen contains a small protracting pin, which is used to mark the intersections of the lines, and to lay off distances from the edge of the plotting scales. A very useful little instrument of this kind may be made by inserting a common needle into a small handle. It is well to be provided with three or four of these, as they are very handy at times to steady a ruler in drawing long lines. The steel pen being as perfect as can be wished, for drawing straight or regularly curved lines (when some guide is used for it) will not do for those lines which are to be drawn by hand unassisted by a ruler, or other means of directing it. It is the usual practice to draw such lines with the small crow or common goose quill. But they can be much more neatly executed by various steel writing pens which have appeared. A very good kind is made by Donkin of London. The nip or point consists of two pieces of thin steel plate, put together nearly at right angles to each other, the part where they meet being bevelled or mitred, to make a joint for the slit of the pen, which is quite close except when the pen is writing. The pressure which is then used bends the nips, and causes them to de-

liver the ink very freely, and so in proportion as the pressure is increased the line becomes broader, as in the common goose quill, but having the advantage of being more elastic in the blades of the nip, which are filed very thin just above the point. Many prefer this form to the round pen, the latter not being able to spring so readily, on account of its being a portion of a tube, however elastic its substance may be. This difficulty is in a great measure obviated in the Patent Perryian Pen, which has been but lately introduced into America. The patentee, by a triangular form which he gives the slit above the points, makes both nips extremely elastic, and his pens are formed on a principle which is decidedly the best in use. In sharpening all these kinds of pens, the back should in the first place be inclined to the hone at an angle of 75 or 80 degrees, moving it backwards and forwards very lightly and steadily to make both points of the same length. After this is done the pen should be turned and both points brought to the same breadth. At first it will not probably write so well as it will after being used a little time, the points being sharp and apt to catch in and tear up the surface of the paper; it is therefore best at first to use it for a while on a piece of rather coarse paper.

In future we shall publish a list of Patents granted to inventors residing in Massachusetts, and the most important ones in other States, which we shall extract from those works in which all the new patents issued are recorded.

PATENTS FOR MASSACHUSETTS,

GRANTED JANUARY, FEBRUARY, MARCH, APRIL, MAY, AND JUNE, 1831.

January.

1. For a mode of *saving water in water power*. Aaron Foot, Williamstown, Berkshire County, Jan. 4.

2. For a *furnace* for generating steam for *culinary purposes*. Jesse Reed, Marshfield, Plymouth County, Jan. 5.

3. For an improvement in Frames for cotton Gins. Ebenezer A. Lester, Boston, Jan. 8.

4. For an improved mode of making Harrows for the purpose of Agriculture, called the 'Revolving Harrow.' Samuel Rugg, Lancaster, Worcester County, Jan. 11.

February.

5. For an improvement in the mode of *Pressing Cheese*, by a 'Screw and eccentric wheel cheese Press.' John C. Pulsifer, and Ebenezer Pulsifer, Ipswich, Essex County, Feb. 14.

6. For an improvement in the *manufacture of buttons*, called 'Metallic shank buttons.' Josiah Hayden, Williamsburg Hampshire County, Feb. 17.

7. For an improvement in the steam boat paddle wheel. Timothy Hunt, Boston, Feb. 17.

8. For a machine for pointing pegs for boots and shoes. William A. Greenwood, Palmer, Hampden County, Feb. 19.

9. For a machine for moving earth, stones, &c. Shadrach Davis, Dartmouth, Bristol County, Feb. 22.

10. For an improvement in *mortise door fastenings.* Leonard Foster, Boston, Feb. 25.

March.

11. *For making axes by machinery;* being an improvement upon the apparatus called the 'oval axe machine.' Stephen Hyde, Williamsburg, Hampshire County, March 2.

12. For an improved *block* for *stereotype plates.* Bradbury Hackett, Boston, March 8.

13. For an improvement in gas metres. H. Robinson, Boston, March 10.

14. For a machine for *grinding apples.* Silas Freeman Jr. New Marlborough, Berkshire County, March 14.

15. For an improvement in the construction of *lamps.* John W. Shulze and Tod Trull, Medford, Middlesex County, March 19.

16. For a machine for *splitting, shaving and cutting leather, skins, &c.* Augustus S. Dawley, Boston, March 22.

17. For an improvement in the construction of *steam boats,* for the passage of rapids. Thomas Blanchard, Springfield, Hampden County, March 28.

18. For an improvement in the mode of *mixing paints.* Jonathan Linnel Jr. Orleans, Barnstable County, March 26.

April.

19. For an improvement in the *method of washing rags* in the manufacture of paper. John Ames, Springfield, Hampden County, April 6.

20. For manufacturing spades and shovels by means of machinery. Charles Richmond and Samuel Caswell Jr., Taunton, Bristol County, April 7.

21. For a machine for making horse shoes. Dana Anthony, Jr., Adams, Berkshire County, April 8.

22. For an apparatus for communicating power to machinery. Samuel Kilburn, Sterling, Worcester County, April 16.

23. For an improvement in couches, sofas, settees and chairs, called the 'windlass couch, sofas,' &c. Charles Adams, Boston, April 18.

24. For a *polishing and graining machine,* for Morocco and other leather. Robert Emes, Boston, April 20.

25. For a *new material for sheaves of blocks.* Caleb Curtis and Thomas C. Smith, Boston, April 20.

26. For an improvement in the *horizontal square piano forte.* Ebenezer R. Currier, Boston, April 22.

27. For an improvement in the machine for *splitting leather.* Alpha Richardson, Boston, April 23.

28. For an improvement in the process of dressing woollen cloths, and cloths composed partly of wool and partly of cotton. Calvin W. Cook, Lowell, Middlesex County, April 23.

29. For an improvement upon a water wheel for propelling boats, for which a patent was obtained on the 22d of December, 1818. Asa Waters, Millbury, Worcester County, April 30.

May.

30. For improvements in a machine formerly patented by Amos Whittemore, for *cutting the teeth*, *pricking the holes*, and setting the teeth in filleting cards. Reuben Meriam, Leicester, Worcester County, May 2.

June.

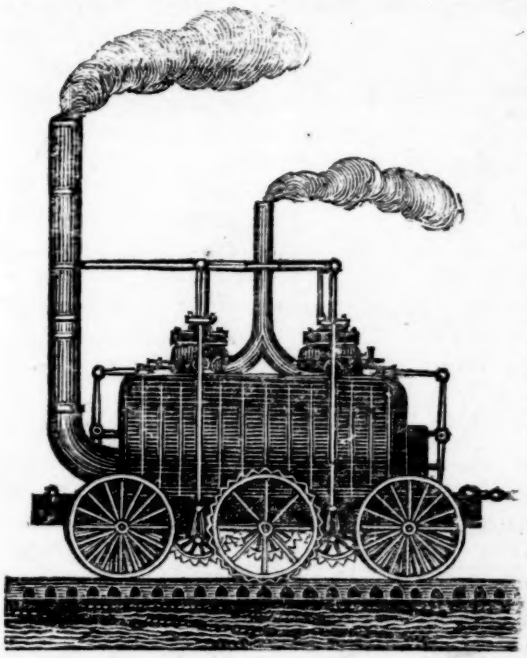
31. For a machine called a 'Self balanced handcart.' George Coolidge, Watertown, Middlesex County, June 13.

RAILWAYS AND CARRIAGES.

It is rather uncertain at what precise period railways first originated. They probably arose from the circumstances of laying down timbers or planks over the obstructions which were presented at the collieries, for the wheels of their rude carriages to roll upon. Afterwards it appears these timbers were laid more systematically and in considerable lengths, and have gradually given place to the many improvements which have been made in this system of travelling that is before us at the present day. In comparing railways with canals, it is evident that each mode has its peculiar difficulties and advantages. Where the first might be built, the second could not. Experience proves that for heavy goods railways are not so well adapted as canals, but for speed of conveyance of lighter articles and passengers, they surpass them. All the railroads that are being built, or are about to be built in Massachusetts, will chiefly derive their income from the transportation of passengers. We have yet a great deal to learn in regard to railways. It is feared by many that the great 'hue and cry' that has been raised within a few years concerning them, will be an 'idle wind which blows nobody any good.' Others who profess to know more of the subject, predict they will be the 'roads to wealth,' to our citizens and states. Each system has its supporters; but it must be left to time to show which will be the most beneficial. All the railways that have as yet been constructed in America have been closed during the winter, and generally long before the canals, and not re-opened until the latter have been travelled on some weeks.

We shall ere long rival England in our locomotions, as we have excelled her in our steam boats. Why will our mechanics allow the different railway companies to import their carriages? Is there not ingenuity enough in New England, to improve on the Rocket and Novelty? It requires but the attention of some of our steam engineers to the subject, to produce an engine which shall excel in all its parts the far famed engines of the Liverpool and Manchester road. As yet there has been but few successful attempts at constructing steam carriages in this country; one, the Cooper locomotive, is now running on the Baltimore and Ohio railroad, and thus far has performed very well. Lately there appears to have been some considerable notice taken of Mr. Sargent's single railway, but it is not probable that it will ever come into general use. This kind of railway was invented and patented

in England, by Mr. Palmer, who has applied it successfully to the gates of the London docks. The cogged railway of Blenkinsop, (of which the cut below is a representation,) seems to be entirely exploded for other than short distances or inclined planes. A great velocity of the engines on this principle is attended with very destructive consequences. 'The boiler is supported by a carriage with four wheels without teeth, and rests immediately upon the axles. The engine is a high pressure one, and has two working cylinders. The connecting rods give motion to two pinions by cranks at right angles to each other, and these pinions communicate the motion to the wheels, which work into the teeth of the railway by working into a toothed wheel on the same axis. An engine of this kind when connected to a train of 30 coal wagons, each weighing more than 3 tons, moved at the rate of about 3¼ miles an hour.' We are yet in our infancy in regard to railways. It is evident that we cannot follow the English roads exactly as models to build ours from, but must adapt them to our climate, and the different kinds of trade. We shall probably have to raise them much higher from the surface of the ground than is done in England, that the snow and ice may not collect in them, and impede the transportation. We have erred greatly heretofore in our canals in not building them wide enough. Experience has proved that a horse can draw a boat carrying 60 tons almost as easy as one of 20. Our locks have been built much too narrow. By recent experiments on the Paisley and Anderson canal, in Scotland, a boat was impelled at the rate of 12 miles an hour with ease, without injury to the banks, this being one of the narrowest canals in Scotland. The boat after having attained a certain speed is raised and floats, as the boatmen term it, on the 'top of the wave' in front, and does not surge the banks. If the banks were walled up with stone, for one or two feet below the surface of the water, and the canal formed 60 feet wide, and 8 or 10 feet deep, with locks 100 feet long and 20 feet wide, a boat might be impelled with a velocity of double what is done at present, and boats of 60 or 80 tons moved with the same expense. This, no doubt, will be effected in all the canals which may be built in future, and will place them once more on a footing to compete with railways, after all which the sanguine projectors have said and written concerning them.



FULTON.

TABLE

Of the Velocity of Boring and Turning Cast Iron.

Inches Diameter.	BORING. *Revolutions of bar per minute.*	TURNING. *Revolutions of shaft per minute.*
1	25·	50·
2	12·5	25·
3	8·33	16·67
4	6·25	12·50
5	5·	10·
6	4·16	8·32
7	3·57	7·15
8	3·125	6·25
9	2·77	5·55
10	2·5	5·
15	1·66	3·33
20	1·25	2·50
25	1·	2·
30	0·833	1·667
35	0·714	1·430
40	0·625	1·250
45	0·56	1·12
50	0·5	1·
60	0·417	0·834
70	0·358	0·716
80	0·313	0·626
90	0·278	0·556
100	0·25	0·50

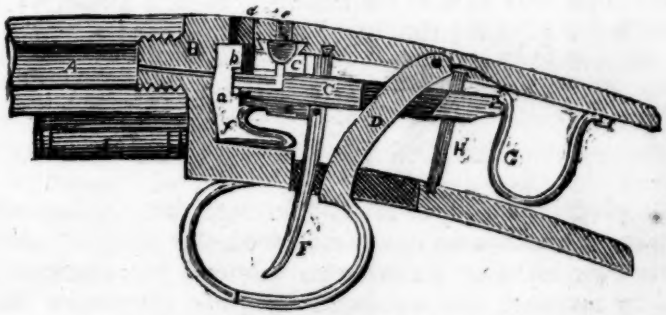
For boring cast iron the proper velocity for the *surface bored* has been found to be 78·54 feet per minute. A greater velocity than this not only takes out the temper of the cutters by producing great heat, but also causes the metal to expand, when if the machine stops for a short time a mark is left from the contraction of the metal. If hand tools are employed in turning, the velocity may be considerably increased. The progression of the cutters may be one-sixteenth of an inch for the first cut, and for the last one twenty-fourth.

CEMENT FOR RENDERING JOINTS STEAM TIGHT. The following receipt forms a strong and durable cement for joining the flanches of iron cylinders of steam engines or hydraulic machines:—Mix boiled linseed oil, litharge, red and white lead together to a proper consistence, always using the larger proportion of white lead. This composition may be applied to a piece of flannel and fitted to the joint. Cisterns built of large square stones and put together with this cement will never leak.

A more powerful cement for withstanding the action of steam is composed in the proportions of two ounces of sal ammoniac, and four ounces of sulphur, made into a stiff paste with a little water.

When the cement is wanted for use, dissolve a portion of the paste in water rendered slightly acid, and add a quantity of iron turnings or filings, sifted or pounded to render the particles of uniform size. This mixture, put into the interstices of iron work, will in a short time become as hard as stone.

NOTE.—From experience it is ascertained, that more depends upon caukling the joints than in mixing the cement. EDS.



MAGAZINE GUN LOCK.

THIS lock was invented and made by George W. Morse, (when about eighteen years of age,) son of Rev. Bryan Morse, of Haverhill, N. H. An account of it appeared in a Portsmouth paper some time ago.

A is a portion of the breech of the barrel; B is the breech-pin which makes the outer boundary of the lock. The guard is divided into two parts. The anterior half serves only to complete the form of a common guard, and is immoveable. The other half D, acts as a lever, and is attached to the upper part of the breech-pin, and passes through a mortise in the hammer, C. By drawing back this half of the guard, the hammer is drawn with it, and by this motion the gun is cocked.

There is a small spring fixed in the upper part of the breech-pin, which throws back the moveable half of the guard after the hammer is fixed for firing, so that the guard then appears to be entire. The hammer, C, consists of a straight bar of steel, two inches long and one-fourth of an inch square, through which is a mortise as above mentioned, for the moveable half of the guard to play in. The hammer is thrown forward by the spring, G. It moves in a straight line, and strikes against the centre of the barrel. The trigger, EF, is secured to a pillar which is placed between the prongs of the breach-pin, and which also supports the hammer. A small spring *f*, presses the arm E of the trigger against the end of the hammer, which keeps the gun cocked. In the operation of cocking the gun, the nipple *a*, which slides into the end of the hammer, is drawn forward by the fixed stop *b*; or rather, it is stopped before the hammer is drawn entirely back. A space is thus made in the hammer directly under the magazine *c*, and the priming falls into this space or cavity. The nipple is one-fourth of an inch

long, and one-twelfth of an inch in diameter, with a cap large enough to cover the head of the hammer, and has a perforation in it large enough to admit a common pin. This hole makes a communication between the space in the hammer, (which receives the priming from the magazine above,) and the charge in the gun. When the hammer is driven forward in the act of firing, the nipple strikes against the barrel, and is forced back into the hammer where the firing is effected by percussion. The magazine contains powder for sixty primings, and is so contrived that neither water nor dampness can penetrate it. The priming powder is put in at *e*. The hole at *d* is for a vent. H is a guide for the hammer, and I the pipe for the ramrod.

THOMAS KEYES, JR.

It is a pleasing task, to follow through all the mazes, and to dwell upon the incidents connected with the rise of an ingenious man, however he may have been favored by circumstances, or assisted by fortune. If we dwell with pleasure upon the character of such a man, with what sensations must we trace the rise and progress of that man, who, imitating the course pursued by Franklin, Ferguson and Simpson, rises from obscurity by his own efforts, without the advantages of education, the assistance of fortune, or the advice of friends, and beats out a path which those in better circumstances would scarcely attempt to follow. That the life of a mechanic, distinguished for his perseverance and application, and with all, a native of our own states, will be interesting, (at least to mechanics,) I will not question. It indeed must be a source of interest to any one, to see an individual of their own class in society, in circumstances inferior to themselves and with less means for improvement, struggling to overcome the difficulties and disadvantages with which he is surrounded; endeavoring, by every means in his power, (without injury to others) to better his condition, either in fortune, or acquirements. Such an individual, should surely be the object of universal esteem. It has been justly remarked, that although the disadvantages are great, of those who are obliged to begin their acquaintance with science late in life, yet all the chances of the race are not against them. The time they have lost, and are anxious to redeem, of itself gives a stimulus that will make up for many disadvantages.

Such was the case with the subject of this sketch, who was born at West Boylston, Mass. His time appeared of so much importance to him, that he often denied himself the necessary time for sleep. As he did not apply himself to a mechanical business until he was 20 years of age, he considered it a duty to redeem it if possible. The cause which prevented him until this age from following his favorite pursuit, was neither poverty nor inclination, but the wishes of his friends, who, 'not seeing as he saw,' endeavored to check what they considered his wayward fancies, and to fix his mind upon the cultivation of the farm, of which

he was to become a part possessor. Although he appeared to yield to the wishes of his friends, yet he never could bring his mind to acquiesce in the idea of spending his life in a pursuit so contrary to his inclinations. While with his hands he cultivated the soil, his mind was panting for that knowledge which he knew as a mechanic he could practice. And, the time which was not occupied in labor on the farm, he spent in the cultivation of his mind. Although he devoted himself to mathematics, natural philosophy and astronomy, yet his taste for music appears first to have shown itself; and the ingenuity displayed in his first attempt to gratify himself is worthy of notice, and is thus described by a friend: 'the first known of his musical performances was upon an instrument of his own manufacture while he was very young; it was made of a shingle, with silk strings strained across in the manner of a violin, a small stick from an apple tree, and some hair from a horse's tail served for a bow; and upon this rude instrument, the young performer has produced music which has been listened to with considerable pleasure.' From this rude but successful attempt may probably be traced the first desire he had to make himself master of the art, in which he afterwards became very proficient as a performer upon several instruments. Some time previous to his leaving the farm, his attention was attracted by a description of an organ in a cyclopedia to which he had access, and from the accurate account of the different parts there given, he formed the idea of making one himself, the parts of which were to be of wood. This was considerable of an undertaking to one situated as he was, without tools, or materials, and many would probably have abandoned the scheme as impracticable; but his perseverance led him to devise means to obviate these difficulties, and by the friendly assistance of a cabinet maker who allowed him the use of his tools, he was enabled to accomplish his object to his perfect satisfaction.

But, with all the fascination and pleasure which naturally follows the study of music, it was made to give way to the more solid sciences. Of these, mathematics, (which is considered by some, as the most dry and insipid of all studies,) held the first place in his esteem. It was considered by him in its true light—as the only foundation on which the other sciences could be firmly built. He thought no time mispent, while engaged in solving the intricate and abstruse problems with which it abounds; and I have often heard him observe, that 'mechanics were not aware of the disadvantage of attending so little to this all-important science.' It must certainly be confessed, that it has been very much neglected by this class of the community; for if we look around, and see how many have been ruined by schemes, which, with a little attention to the truths explained in this science, they might have avoided, we cannot fail of being impressed with the necessity of urging it upon the candid consideration of mechanics. Let it but be realized, that this is the key stone, by which the grand arch of science is secured, and on which the hopes of genius must be based, then will those difficulties which appear insurmountable, vanish—the abstruse will be simple, the useless important, and the tedious pleasing.

In the study of astronomy, which had engaged his attention during the latter part of his life, he found his knowledge of mathematics of the greatest service, in making the numerous calculations which were necessary in the construction of apparatus, by the aid of which correct ideas could be conveyed to the minds of the youthful, and uninformed, of this sublime and interesting science. An Orrery, which he contrived for the purpose of illustrating the relative motions of the solar system, is very simple and economical, and, when united with its correct calculations and ease of management, forms one of the most useful instruments of the kind. To be used in connection with his Orrery, he had in view an apparatus which was to embrace the Lunarium and Tellurium on a plan different from any at present known. But unfortunately the traces of the design which he has left are so obscure, that it is impossible for any one to understand his views sufficiently to complete it. A piece of board which he had prepared for the purpose of making a working draft of his plans, was not used, in consequence of his being taken ill with that disease, from which he never recovered.

In addition to the studies which have been mentioned, he likewise pursued that of drawing and painting; the latter, however, occupied but a small share of his time. To his taste for painting, may be attributed an apparatus he contrived, a description of which, may not be uninteresting; an experiment in optics, which is no doubt familiar to many, and is performed by having a piece of circular board painted in equal proportions of blue, yellow, and red, and made to revolve with great velocity. The board will appear while whirling of a dirty white. If the board were divided into twelve parts instead of three, and should have four series of the colors, blue, yellow and red, one-fourth of the velocity would produce the same effect. The 'cameleoscope' is the name of the machine contrived by Mr. Keyes, so called from the various changes of color produced by it while in motion. It is made by cutting out nine of the twelve parts of the board, and leaving but one series of colors equally divided. Then by making four such boards painted with various colors, revolve behind each other with different velocities, it will exhibit a continual change of color; and if by any means it could be stopped, when a pleasing shade presented itself, it might be known what colors had produced it. This was a scheme, which is probably more curious than useful. But although it might not have been of any practical utility, yet it might have contained hints which may hereafter be applied with advantage.

We may here regard a trait in the character of Mr. Keyes which is worthy of all imitation, that of communicating information to others freely, and especially those discoveries which we have made, and do not know to what purpose to apply them. A free communication of sentiment and opinion between different persons, is acknowledged to be of the greatest benefit. The institution of Lyceums, and other societies, is but to assist in accomplishing this end. Mr. Keyes was fully aware of the advantage resulting from persons associating together for mutual instruction; and acknow'

edged that he had been greatly assisted in the study of astronomy by being a member of a small society of individuals in his native village, who met together for mutual improvement in that science. At the head of this social club, was the venerable and respected astronomer and philosopher, Robert B. Thomas. To this gentleman Mr. Keyes looked up with reverence; his kindness in furnishing books, and assisting him in his various studies, were favors which were never forgotten.

Let it not be urged, that a person who turns his attention to many things can do nothing well; for, although it may be true in some degree, yet it is not without exceptions. Sir William Jones, the greatest civilian of modern times, contended, 'that no opportunity for improvement in any study, which presented itself, should be neglected;' and he himself, while studying the law, took advantage of vacations to peruse the light works of the French and Italians, besides making a favorite pursuit of dancing and fencing. And yet, all this variety, which would be thought to distract his attention, aided in making him the greatest lawyer and most profound scholar of the age. The whole object of all the studies of Mr. Keyes tended to one grand point—the acquisition of knowledge. If his pursuits were various, they were no less correct. As a cabinet maker, a clockmaker, an apparatus maker, or a student, his work bore the stamp of a mathematical mechanic.

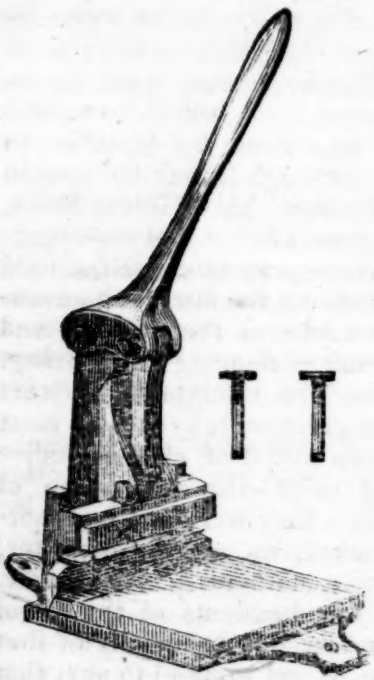
I have thus attempted to compile a few incidents of the life of one, worthy of the respect of all classes, but especially of that of which he was the ornament. I will not pretend to say, that he was more of an ornament to mechanics than many others who have preceded him; for there have been those, whose names have been suffered to moulder in oblivion, when they deserved to have been handed down for the admiration of posterity. But, if some have been neglected, it does not follow that we should neglect all. Instead of neglecting them, let us endeavor hereafter, to perpetuate the remembrance of those, whose lives afford an example worthy of imitation. The rapid march of intellect and improvement among the producing classes, within a few years past, awaken the fondest hopes for its permanence and duration. If this state of things should continue, biographies and examples will be needless. And we can now apparently lift the veil of futurity, and see the existence of that state, 'when in the proud career of mind our country will seek her fame.'

Mr. Keyes died Nov. 1831, at the age of 29. J. M. W.

A MECHANIC who attempts to monopolize business or to injure his compeers by underselling, is guilty of high treason against society, as he violates that integrity and good will, without which the social compact would soon be broken asunder. I always suspect that such a man has not paid for his goods, or sells those of an inferior quality. GOOD.

BOOK BINDER'S STABBING PRESS.

(Invented by the proprietor, John Mead, of Boston.)



THIS machine has been found to answer a valuable purpose. It requires very little power to work it, the awls being forced down by a lever which increases the power of the hand about ten times. This press is used for stabbing books for stitching, and also for strapping. The stitching awls are represented in their places in the press. They can be taken out at pleasure, or shifted to any distance apart, to suit the various kinds of work. The strapping awls are shown by themselves at the side of the plate. They can also be placed at any required distance apart in the press. The awls are made fast between plates of iron, by means of screws. There is a great saving of time and labor in the use of this press. The work is done with perfect uniformity, and much more accurately than by any other method.

It appears to us that this will prove a very useful article to book binders generally, especially to those of the larger establishments. EDS.

NEW ENGLAND ASSOCIATION OF FARMERS, MECHANICS AND OTHER WORKINGMEN. We observed in a recent number, that we should probably publish an abstract of the report of the late Convention from which this Association was formed. It may be only necessary to observe, however, at this late date, that the Convention was well attended; that the time was occupied by several interesting discussions; and that a number of important resolutions relating to the interests of the Workingmen were adopted. The Convention finally formed the Association named at the beginning of this notice, the Constitution of which has been published in several of the prints of the day. Auxiliary Associations have since been formed in a number of towns, and one has been instituted and is making good headway in this city. The main objects of these Associations are, the promotion of education, and the regulation of working hours.

ANSWERS.

In answer to the question as to the pressure sustained by the ball of an air gun, I would say, it was nearly 967 lbs. on the square inch. My solution is as follows:

$4 \times 4 \times 4 = 64$, cube of the diameter of the ball.

$64 \times 0{\cdot}5236 = 33{\cdot}51$ cubic inches contained in the ball, and is equal to one atmosphere.

As 1·2 oz. is to 1728 inches, so is 1·5 oz. to 2160 inches.

$2160 \div 33{\cdot}51 = 64{\cdot}45837$ atmospheres added by the condenser.

$64{\cdot}45837 \times 15 = 966{\cdot}87555$ lbs., the pressure on the square inch.

The air which the ball contained at first must not be taken into the calculation, as that only counterbalanced the external atmosphere. There were 2160 cubic inches of air forced into the ball, which is more than 64 times its bulk; so we say the ball had a pressure of more than 64 atmospheres, or more than 64 times 15 lbs. on the square inch. T. C.

In answer to the question respecting the column of water, I should say that three-fourths of the power would be expended on the water wheel, and one-fourth remain in the water. F.

Messrs. Editors—In answer to the question in the last number of the mechanic respecting the number of calves which might be purchased for eighty dollars, I would say, that with eighty dollars he could purchase sixteen calves at five dollars each, and twenty at four dollars each.

As for my form of solution, I first supposed the number of calves to be 10. They would cost $8 each, adding four, making 14 at $7 would require $98. I then tried 20. They would be $4 each; adding four would be 24 at $3, amounting to only $72. This was nearer than the first supposition, but the number was too high. I afterwards tried 16 at $5, adding four, making 20 at $4, when I found it came out right. N. E. I.

I send the following answer to the question relating to the calves in your last number:

Let x represent the number of calves.

Then by terms of question $\frac{80}{x} = \frac{80}{x+4} + 1$.

By multiplication and transposition $x^2 + 4x = 320$.

Add 4 to each member of equation $x^2 + 4x + 4 = 324$.

Extracting the square root $x + 2 = 18$.

$x = 16$, number of calves.

$\frac{80}{x} = 5$, price of each.

Answer—16 calves at $5 each. T. S. H.

To the question relating to the letters of the Alphabet in our last, we have received the three following answers:

15,428695,175819,469421,124000. C. W. F.

400,717299,744605,635584,000000. W.

403,291461,126605,635584,000000. T. C.

Since preparing the above answer to the alphabet question, I have been reflecting on the difficulty of forming a right conception of such high

numbers. I thought some plan might be adopted to convey a tolerable idea of the vast amount. I find that a number of bricks of 4 inches by 8 equal to the answer, would cover more than sixteen thousand millions of such globes as the one we inhabit. And if we adopt grains of sand of one hundredth part of an inch square, instead of bricks, they would cover fifty thousand such globes. T. C.

QUESTIONS.

Being in quest of information, I should be obliged to some of your numerous correspondents to inform me of the best method for grinding brass plates, similar to the plate of an air pump.

I would also ask your correspondent, J. M. W. if he succeeded in drying his solution of caoutchouc, and the manner in which he did it; I have tryed the same solvent repeatedly, but I never could make it dry, so that the sides would not stick together after it had been on the cloth twelve months or more. C. D.

As there are strenuous efforts being made among the mechanics and workingmen of New England, for reducing the number of working hours, and as this measure is strongly opposed by employers and capitalists, it seems to me that a full and candid discussion of the subject in the pages of your magazine, would be quite appropriate to the work, and beneficial to your readers. I therefore request some of your correspondents to show the truth or falsehood of the following assertion: 10 hours in 24 are sufficient for a Mechanic to labor. D. B. H.

How can the nine digits be placed so as to take their cube root without leaving a remainder.

Messrs. Editors—I believe it has been generally observed, as I have often heard it stated by many, that the *atmosphere is never dark on a windy night.* An explanation of the cause I never saw given. Perhaps some of your correspondents may solve the mystery. **

The Conductors of the Young Mechanic, wishing to publish information on the subject of mutual improvement, invite correspondents to communicate information relating to exercises, and also on the most proper construction of a Building for Lyceums and other societies of a similar character.

TO CORRESPONDENTS.

Two answers to the Apprentice question published in our second number, have been received. We have selected one, which will appear in our next. We would remind correspondents, that it is necessary that all answers to questions, as well as articles on other subjects, should be as brief as possible, as it is our wish that each number of the magazine shall contain an agreeable variety. Other articles on hand will receive immediate attention.